CSAP Center for Substance Abuse Prevention
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Applying Prevention That Works!
Eye On Prevention
Issue 6

Teenagers Who Drink Alcohol May Damage Their Brains

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Alcohol is the drug of choice among youth. Many young people are experiencing the results of drinking too much, too early. Even though underage alcohol use is against the law, it is a leading public health problem in this country,[1] and is more likely to kill young people than all illegal drugs combined.[2]

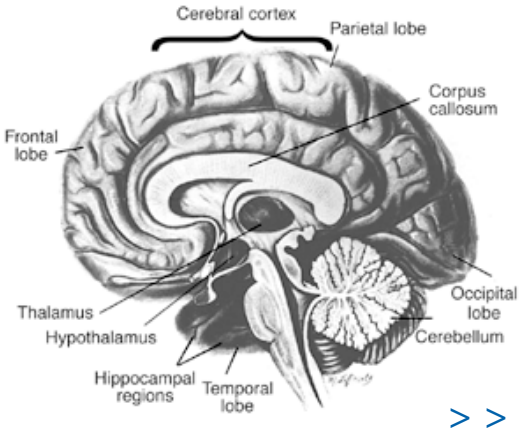
Nearly half of all 8th graders have had at least one drink, and over 20 percent report having been "drunk." Consuming five or more drinks of alcohol at a time for males, and four or more drinks at a time for females is considered binge drinking.[2] Nearly one third of all 12th graders binge drink. Many people believe that adolescents can easily recover because, compared to adults, their bodies are more resilient, yet the opposite is true. Young adults are especially likely to binge drink and to drink heavily. Heavy alcohol use may have extensive and long-lasting effects on the brain, ranging from simple "slips" in memory to conditions that last a lifetime.[3]

The human brain continues to develop in the teen years and even into the 20's. The brain's frontal lobe, which is involved in planning, decision-making, impulse control and language, undergoes a major remodeling during the teen years. There is concern that drinking alcohol during this period of growth may lead to brain damage, especially for memory, physical skills and coordination.[4]

Most of the damage done by alcohol during adolescence is due to its interference with neurotransmitters, the things that send messages to the brain. Alcohol injects chemicals into the brain that affect important growing processes. For example, alcohol stimulates the release of dopamine, the 'feel-good" neurotransmitter. Whenever a person heavily uses a substance like alcohol the body stops producing the levels of dopamine that it normally needs. As a result, a person will feel worse and worse when they don't have alcohol in their system.[5]

Heavy alcohol use interferes with the brain's ability to form memories. That's why it's hard to remember what happened after a night of heavy drinking. The results of alcohol use begin to add up. Evidence shows that adolescents who are heavy drinkers have a smaller hippocampus than nondrinkers. The hippocampus is the brain structure that is key to the process of recording new memories. Adolescents, unlike adults, are still forming connections between nerve cells that play a role in memory, and alcohol may damage the development of these connections. Adolescents who drink a lot of alcohol also end up having more memory and learning impairment than adults who drink the same amount because their brains are more pliable and easily affected by alcohol's damage.[2]

There are specific parts of the brain that are affected by alcohol. The frontal lobe, hippocampus, striatum, pons and medulla, and cerebellum all suffer when alcohol is consumed. The hippocampus is important in learning, emotions, and memory formation, particularly for new facts and events. The striatum is involved in complex behaviors like making decisions while driving a car. The pons and medulla contain groups of cells that control vital reflexes—like breathing, heart rate, gagging, etc. Alcohol can shut down these reflexes, causing death. The cerebellum involves balance, coordination, and movement—such as standing still, walking, and physical activities.[2,3,5]



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Alcohol's Effects on the Brain

➤ Adolescent drinkers scored worse than non-drinkers on vocabulary, general information, memory recall and visual-spatial functioning. The hippocampus in underage binge drinkers has also been found to be smaller than non-drinkers.[2, 5]

➤ Adolescent binge drinkers perform worse in school, are more likely to fall behind, have higher possibility of school drop-out, and have an increased risk of social problems, depression, suicide thoughts and violence. Binge drinkers are also more likely to earn grades that are mostly D's and F's in school.[1, 7]

➤ Heavy drinking over many years may result in serious mental disorders or permanent, irreversible damage to the brain or nervous system.[5, 6]

➤ Since teens are more sensitive to the alcohol's effects, it makes them think "they can hold their liquor" or drink more without harmful effects to their bodies. For teens, heavy drinking can lead to adaptations in the brain that requires more and more alcohol in the future in order to feel the same pleasurable effects from the alcohol. These changes affect the "hard-wiring" of the nervous system.[6]

➤ People who reported starting to drink before the age of 15 were four times more likely than those who delayed onset of alcohol use to become dependent on alcohol at some point in their lives.[1]

Young Teens and Alcohol: The Risks

While some parents may feel relieved that their teen is "only" drinking, it is important to remember that alcohol is a powerful, mind-altering drug. Not only does alcohol affect the mind and body in often unpredictable ways, but teens often lack the maturity and coping skills to successfully refuse offers of alcohol. As a result:

➤ Alcohol-related traffic crashes are a major cause of death among teens.

➤ Teens who use alcohol are more likely to be sexually active at earlier ages, to have sexual intercourse more often, and to have unprotected sex than teens who do not drink.

➤ Young people who drink are more likely to be victims of violent crime.

➤ Teens who drink are more likely to have problems with school work and school conduct—be disruptive, hyperactive, and aggressive.[8, 9]

The message is clear—alcohol use is very risky business for young people. Even one night of heavy drinking can have serious consequences that last well beyond the teenage years—such as alcohol-related car crashes, unintended pregnancies, and physical assaults leading to arrest or jail.[4]

Educating children and teens about the dangers and consequences of underage drinking is important. Kids don't need to experience alcohol to know that it is bad for them—they need parents and others to tell them in a way that makes sense to them. Parents—protect your child's brain and their future—talk to your kids about the dangers of underage drinking. Tips for parents are available at:

➤ http://family.samhsa.gov

➤ www.theantidrug.com

➤ http://pubs.niaaa.nih.gov/publications/MakeADiff_HTML/makediff.htm

Sources

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